

STUDIES IN AUSTRALIAN EMBIOPTERA.

PART V: GEOGRAPHICAL VARIATION IN *METOLIGOTOMA REDUCTA* DAVIS.

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(Thirteen Text-figures.)

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Introduction.

It has been noted (Davis, 1940, p. 156) that *Metoligotoma reducta* Davis occurs on the North Coast of New South Wales, and that specimens from that region differ from typical specimens in structure. No attempt has been made previously to describe and name these northern variants, since a large hiatus in records—between Port Macquarie and Broken Bay—has rendered impossible a proper correlation of the structural variation with geographical distribution. A series of males was recently collected at Myall Lakes, approximately half-way between Port Macquarie and Broken Bay, and it is now possible to describe two new subspecies of *M. reducta*.

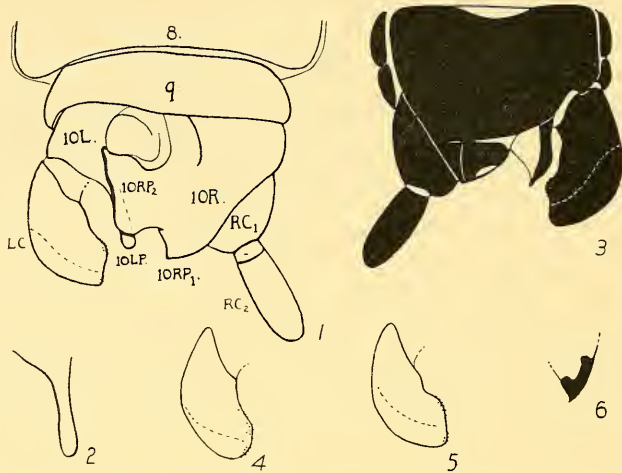
The type subspecies, *M. reducta reducta*, was described (Davis, 1936, p. 248) from Eleanora, near Narrabeen, New South Wales. It was later re-described with narrower limits (Davis, 1938, p. 227, Figs. 1-4), the following additional localities being listed for specimens agreeing in detailed structure with the type series (Davis, 1938, Map 1): Sydney (Lindfield, Mosman, and Sydney University Grounds); Kurrajong Heights; Otford; and Hardy's Bay, Broken Bay. It has since been collected at National Park, not far north of the previous Otford record. The following points may be stressed from the previous description of the terminalia (Davis, 1938, Figs. 2-4): The posterior process of the right hemitergite of the tenth abdominal segment in the male is short, obtuse, and directed inwards; the inner process of this hemitergite is smooth in outline; the process of the left hemitergite ends in a blunt and rather short expansion; the outline of the left cercus is smooth and approximately pyriform in dorsal view; the structure usually referred to as the left cercus-basipodite is blunt, and is chitinized only distally and on the left.

METOLIGOTOMA REDUCTA SUBTROPICA, n. subsp. Figs. 1-6.

Holotype ♂. Length 10 mm.; head 2.1 mm. × 1.8 mm. Colour as in the type subspecies, living specimens having the dorsal sclerites black to very dark brown, dull, the sternites dark brown, paler medially in the anterior abdominal region, the segments of the antennae and cerci light brown, those of the legs dark brown with obvious pale areas near the joints. Head outline as in the type subspecies; antennae 16-segmented, length 3.2 mm., apparently complete. Terminalia (Figs. 1-3) differing from the type subspecies in the posterior process of the right hemitergite, which is shorter and less incurved; the inner process of the right hemitergite, which has its antero-medial angle prolonged to a thin, obtuse lobe; the termination of the process of the left hemitergite, whose expanded portion is longer and thinner, and regularly ovate; the left cercus, which is less smooth in outline, having a blunt lobe on the inner face in the distal third; and the left cercus-basipodite, which is more slenderly tapered.

Six other males were secured from the same colony as the holotype. The size limits are: Length 8-11 mm.; head 1.4-2.2 mm. × 1.1-1.9 mm.; antennae with up to 18 segments. In one of these, the terminalia are indistinguishable from the holotype; in two others, the terminalia differ from the holotype only in having the distal expansion of the process of the left hemitergite a little shorter; in the fourth, the terminalia agree

with those of the holotype except that the outline of the left cercus is a little smoother. The fifth has the left cercus much smoother in outline (Fig. 4), but otherwise agrees with the holotype; the sixth has the left cercus (Fig. 5) somewhat different and the left cercus-basipodite (Fig. 6) subacute.



Figs. 1-3.—*Metoligotoma reducta subtropica*, n. subsp., holotype ♂. 1. Terminalia from above, $\times 33$. 2. Process of left hemitergite from above, extremity raised to same level as base, $\times 33$. 3. Terminalia from below, $\times 33$, all membranous parts, whether melanized or not, shown as black.

Fig. 4.—*Metoligotoma reducta subtropica*, n. subsp., ♂ from same colony as holotype, left cercus from above, $\times 33$.

Figs. 5-6.—*Metoligotoma reducta subtropica*, n. subsp., ♂ from same colony as holotype. 5. Left cercus from above, $\times 33$. 6. Left cercus-basipodite from below, $\times 33$.

All figures based on camera lucida outlines; setae omitted.

8, 9, eighth and ninth abdominal tergites; 10L, 10R, left and right hemitergites of tenth abdominal segment; 10LP, process of 10L; 10RP₁, 10RP₂, posterior and inner processes of 10R; RC₁, RC₂, first and second segments of right cercus; LC, one-segmented left cercus, broken line representing demarcation between two fused larval segments.

The male terminalia of this subspecies show in some respects a superficial structural approach to *M. illawarrae illawarrae* Davis (Davis, 1938; cf. Figs. 6-8), but it is unlikely that this indicates any true relationship. The range of *M. illawarrae illawarrae* is more or less coastal, and extends from Jervis Bay to Broken Bay, in which latter locality it occurs in the field beside *M. reducta reducta* without any trace of intergradation. In other respects, especially the left cercus, *M. reducta subtropica* resembles *M. begae* (far South Coast of New South Wales), a species which is considered to be a close ally of *M. illawarrae illawarrae*.

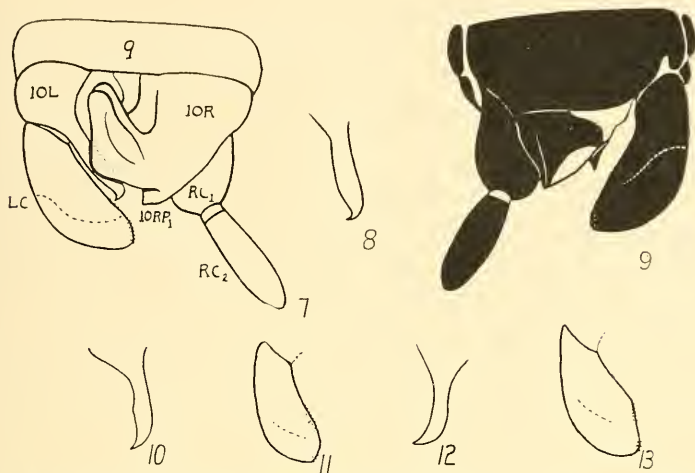
Allotype ♀. Length 12 mm.; head 1.5 mm. \times 1.2 mm.; larviform, and apparently not distinguishable from the females of other species of the genus.

Locality.—Crescent Head, near Kempsey, N.S.W., 13.viii.39, C. Davis coll.; colonies in mats of dead leaves below trees of *Banksia integrifolia* Linn. f. All specimens in the Macleay Museum, University of Sydney.

METOLIGOTOMA REDUCTA ACUTA, n. subsp. Figs. 7-9.

♂. Length 6.5-10.0 mm.; head 1.2-2.1 mm. \times 1.0-1.8 mm.; colour as in the two other subspecies. Structure of head as above, some capsules almost larviform by hysterotely. Antennae with up to 19 segments, maximum length observed 4.0 mm. Terminalia (Figs. 7-9, holotype) with the posterior process of the right hemitergite as in *M. reducta subtropica*, but the inner process smoother, although not as smooth as in the type subspecies. Process of left hemitergite differing from both the other subspecies (i.e., from populations to the north and to the south) in having an acute termination bent to the left. Left cercus smooth in outline, but with the inner margin straighter than

in *M. reducta reducta*. Left cercus-basipodite slender, tapered, subobtuse, rarely almost acute. Twenty-one males examined in detail.



Figs. 7-9.—*Metoligotoma reducta acuta*, n. subsp., holotype ♂, corresponding structures and magnification to Figs. 1-3.

Figs. 10-11.—*Metoligotoma reducta acuta*, n. subsp., ♂ from Port Macquarie showing structural approach to *M. reducta subtropica*. 10. Process of left hemitergite from above, extremity raised to same level as base, $\times 33$. 11. Left cercus from above, $\times 33$.

Figs. 12-13.—*Metoligotoma reducta acuta*, n. subsp., ♂ from Mingaletta, near Kempsey, showing structural approach to *M. reducta subtropica*. Corresponding structures and magnifications to Figs. 10-11.

♀. Length 8-10 mm.; head 1.3-1.7 mm. \times 1.0-1.3 mm.; antennae with up to 16 segments, maximum length observed 2.0 mm. Larviform, as above. Ten females examined.

Locality.—Mungo Brush, Myall Lakes, 5.ix.41, C. Davis coll.; colonies amongst fallen leaves. Holotype ♂, allotype ♀, paratype males and females, Macleay Museum.

The following specimens, which fall within the size limits of the type series, are referable most closely to this subspecies:

♂ from Port Macquarie (15.viii.39, C. Davis coll.), with the process of the left hemitergite (Fig. 10) acute, the termination bent to the left less than in the type specimens; the left cercus (Fig. 11) more irregular in outline; and the left cercus-basipodite less slenderly tapered. In these characters the specimen is intermediate between *M. reducta acuta* and *M. reducta subtropica*; in other respects, e.g., the inner process of the right hemitergite, it agrees with the type series of the former.

Two males from Mingaletta, near Kempsey (15.viii.39, C. Davis coll.), with the process of the left hemitergite (Fig. 12) similar to the Port Macquarie specimen, the left cercus (Fig. 13) and cercus-basipodite also rather similar, and otherwise agreeing with the type series of *M. reducta acuta*.

These specimens have been placed in the Macleay Museum.

Further search in localities in the Kempsey district would probably reveal additional intermediates between the subspecies *M. reducta subtropica* and *M. reducta acuta*. It is considered likely that the area between Myall Lakes and Broken Bay will prove to be a zone of gradual structural transition between *M. reducta acuta* and *M. reducta reducta*. Subspecific nomenclature, the mark of intergrading geographic races, has accordingly been applied.

Key to the Subspecies of *Metoligotoma reducta*.

On the earlier specific key (Davis, 1938, p. 250), all subspecies will run down to *M. reducta*, no specimen having a true spine on the tip of the left cercus-basipodite as in *M. illawarrae*. The subspecies may be separated on the male terminalia, as follows:

1. Termination of process of left hemitergite of tenth abdominal segment acute *M. reducta acuta*, n. subsp.
 Termination of process of left hemitergite obtuse 2
2. Left cercus irregular in outline in dorsal view, typically with a swelling on the inner face in
 the distal third; antero-medial angle of inner process of right hemitergite produced to a
 tapered process *M. reducta subtropica*, n. subsp.
 Left cercus smooth in outline in dorsal view, approximately pyriform, with no lobe on the
 inner face; inner process of right hemitergite smooth in outline *M. reducta reducta* Davis

List of References.

- DAVIS, C., 1936.—Studies in Australian Embioptera. Part i. PROC. LINN. SOC. N.S.W., 61 (5-6), 229-253.
 ———, 1938.—Id. Part iii. Ibid., 63 (3-4), 226-272.
 ———, 1940.—Id. Part iv. Ibid., 65 (1-2), 155-160.
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